Description

Drawer pull-out guide

[0001] The invention relates to a pull-out guide for drawers.

[0002] Drawers, for example in kitchen furniture, are usually guided in such a way that they can be pulled out fully. For this purpose, a drawer guide which comprises a carcass rail connected to the carcass or the cupboard wall and a pull-out rail which is or can be connected to the drawer is arranged on each side of the drawer. However, the adjustability of these two rails is not sufficient in order for it to be possible to pull the drawer out fully, so that a central rail is arranged between them. In order to ensure that the central rail does not lose its correct position over the course of time, control arrangements are present. Support rollers, which are not only to ensure easy displacement but also have to carry the weight of the drawer, are present on the one hand between the carcass rail and the central rail and on the other hand between the central rail and the pull-out rail.

[0003] An example of a control arrangement for a pull-out guide fitting (DE 203 07 757 U1) uses a control wheel designed as a gearwheel which meshes with a rack on the carcass rail and a rack on the pull-out rail. The control wheel can also be designed as a friction wheel. In this case, it is made from a flexible material and has a diameter which is larger than the distance between the running profiles of the carcass rail and pull-out rail.

[0004] As far as the support and running rollers carrying the weight of the drawer are concerned, it is known (AT 40 62 20 B, AT 40 50 10 B) to mount a projection made of a softer material, which is for

example injected into a peripheral groove, in the running surface of the roller. With increasing load, this peripheral projection is deformed in such a way that the harder running surface of the roller is then brought into use.

[0005] Furthermore, a drawer opening with three rails is known, in which a control roller 18 which has a hub and a tire made of rubber is mounted on the central rail. The hub has two flanges designed in its end region, between which the tire made of rubber extends (US 4,737,039).

[0006] The invention is based on the object of further improving a pull-out guide for drawers with regard to improved running characteristics, in particular also a reduction of the running noise.

[0007] To achieve this object, the invention proposes a pull-out guide with the features mentioned in claim 1. Developments of the invention form the subject matter of subclaims.

[0008] The carcass rail, also referred to as the support rail, is connected to the carcass of the cupboard. The load of the drawer is carried by the support rollers between carcass rail and central rail on the one hand and between central rail and pull-out rail on the other hand. The control roller mounted rotatably on the central rail serves exclusively for synchronizing the position and movement of the central rail with the pulling-out and pushing-in operation of the drawer.

[0009] In a development of the invention, the control roller comprises a bearing part in the form of a hard body and a soft body which at least in part projects in the radial direction in relation to the latter. This soft body preferably extends as a ring around the

entire periphery of the control roller but is preferably present over only part of the axial extent of the hard body, as an annular projection as it were.

[0010] It has proved to be especially advantageous if the soft body is arranged in the region of only one axial end side of the control roller.

[0011] In a development of the invention, the control roller is designed as a two-component construction, in particular with the material pairing of plastic and metal, or as a combination of zinc and steel.

[0012] However, it is likewise possible and lies within the scope of the invention that the hard body and the soft body are two separate components which are assembled before mounting of the control roller. In this connection, the soft body can also be mounted loose on the hard body.

[0013] In particular, the soft body is arranged between a shoulder of the hard body and a bearing of the control roller. In this way, the combination of hard body and soft body can be produced very simply and cost-effectively.

[0014] It is likewise possible that the soft body is fixed between a shoulder of the hard body and a retaining washer.

[0015] In order at all events to make possible quiet rattle-free running, provision can be made according to the invention in a development that the spindle on which the control roller is mounted has a cross section which differs from circular with a larger diameter in the pull-out direction. This affords a certain possibility of compensating the position of the control roller in the direction between the two rails with which it is in engagement, without play being allowed

in the pulling-out direction. It has been found that this possibility results in permanent quiet bearing.

[0016] In particular, the cross section of the bearing spindle is designed to be roughly elliptical with the major axis in the pulling-out direction.

[0017] The invention proposes arranging the spindle on a holding device, in particular designing it in one piece therewith, which can be connected to the central rail by simple possibilities, for example by snapping-in and/or catching-in.

[0018] Irrespective of whether it is a two-component part or consists of two parts, the control roller can also be fixed on the spindle by simple pushing-on and if appropriate snapping or by slight deformation.

[0019] Further features, details and advantages of the invention emerge from the patent claims, the wording of which, just as the wording of the abstract, is by reference included in the content of the description, the following description of preferred embodiments of the invention and the drawing, in which:

figure 1 shows the end view of a pull-out guide for drawers;

figure 2 shows a section through the pull-out guide with the control roller illustrated;

figure 3 shows an axial section through a first illustrative embodiment of the control roller;

figure 4 shows a section corresponding to figure 3 in a second embodiment, and

figure 5 shows on enlarged scale the arrangement of the control roller between the two rails.

[0020] Figure 1 shows first in an end view how the pull-out guide is designed. With the aid of one or more angle elements 1, the carcass rail or support rail 2 is attached to the inside of the carcass. The central rail 3 is displaceable in relation to the carcass rail 2 with the aid of rollers 4. The pull-out rail 5 is in turn, with the aid of rollers 4, mounted displaceably in relation to the central rail 3. The drawer is then connected to the pull-out rail 5, for example by placing it thereon or by screwing it on. When the drawer is pulled out, the pull-out rail 5 is therefore displaced together with the drawer, which leads to the central rail 3 being taken along. When the rollers 4 between the pull-out rail 5 and the central rail 3 roll, the central rail 3 is moved at roughly half the speed. Owing to the occurrence of slip, however, the position of the central rail can change slightly. To make the displacement movement easier, therefore, synchronization of the movement of the central rail with the pulling-out and pushing-in movement of the drawer is desirable. For this purpose, the central rail 3 comprises a control roller 6 which is in frictional engagement with a flange 7 of the pull-out rail 5 and a flange 8 of the carcass rail 2.

[0021] While the rollers 4 between the rails carry the load of the drawer, the control roller 6 serves for synchronizing the movement of the central rail during pulling-out and pushing-in of the drawer.

[0022] Now to figure 3. Figure 3 illustrates a section through the bearing of the control roller 6, the section plane running in the pulling-out direction, that is horizontally in figures 1 and 2. A bearing plate 10 connected to the central rail 3 with the aid of catch projections 11 serves for fastening the

control roller 6. The catch projections 11, which have outwardly directed catch noses at their free ends, are pushed through corresponding openings 12 of the central rail 3 with a certain deformation and then spring outward.

[0023] On the front side facing away from the central rail 3, the bearing plate 10 comprises, formed on in one piece, the spindle 13 for supporting the control roller 6. In the illustrative embodiment in figure 3, the front, that is free, end of the spindle 13 is provided with an indentation 14, so that two inwardly bendable front ends 15 are formed. The two front ends 15 have a rearwardly directed, that is in the direction of the central rail 3, contact shoulder 16.

[0024] When the front ends 15 have been deformed inward, the control roller 6 can be pushed onto the spindle 13. It is then fixed by the contact shoulder 16. The control roller 6 comprises a hard body 17 with a cylindrical outer surface which has a certain beveling 18 in the front region. In the region of the opposite end side, the hard body 17 has a recess which has a contact shoulder 19 running parallel to the front side of the bearing plate 10. In the space thus formed between the contact shoulder 19 and the bearing plate 10, an all-round ring 20 is inserted, which has the form of an A ring in the example illustrated. The radial outer side of this ring 20 projects slightly beyond the cylindrical outer side 21 of the hard body 17. When insertion between the two flanges 7, 8 takes place, it is therefore first the outer side of the ring 20 which bears against the flanges 7, 8.

[0025] In the embodiment illustrated in figure 3, the ring 20 is a separate component which can be connected to the hard body before the hard body 17 is pushed onto the spindle 13. However, it is also possible and lies within the scope of the invention that the unit

consisting of hard body 17 and ring 20 made of softer material is produced as a two-component construction.

[0026] The hard body 17 can be made of metal, for example, and the ring 20 of plastic. However, it is also possible that the hard body 17 consists of a harder material and the ring 20 then of a softer material.

[0027] Figure 4 shows a second embodiment, in which the same control roller 6 is used in reversed orientation. The bevel 18 now bears against the front side of the slightly modified holding plate 30. On the other hand, the recess with the shoulder 19 is arranged on the opposite end side. The spindle 23 does not have a front indentation 14 but extends solidly to the front side and there has a projection 24 of reduced diameter. After the hard body 17 and the ring 20 have been put on, a retaining washer 25 is then put onto the front end of the spindle 23, to be more precise onto the portion 24 of reduced diameter, and is secured there by deformation of the outer end 24. The ring 20, which can be the same ring as in the embodiment according to figure 3, therefore again projects in the radial direction slightly beyond the otherwise cylindrical surface 21 of the hard body 17.

[0028] The holding plate 30 is fastened to the central rail 3 by projections which are inserted into openings. The bearing plate 30 is riveted to the central rail 3 from the rear side by a light hammer blow.

[0029] Figure 5 then shows on enlarged scale a detail from figure 2. The bearing plate 30 extends in its longitudinal direction in the pulling-out direction. The cross section of the spindle 23 is elliptical. The major axis of the ellipse 23 runs in the pulling-out direction, that is from left to right in figure 5. The minor axis of the ellipse runs in a direction at right

angles thereto and is therefore clearly smaller. The control roller 6 is guided accurately in the pulling-out direction and the pushing-in direction but has a certain deliberate play in the direction at right angles thereto which is of course smaller than the difference between the inner opening of the control roller and the minor axis of the ellipse of the spindle 23.